

REMARKS

The Examiner's non-final Office Action dated December 5, 2003 has been received and its contents carefully noted. The Applicants respectfully submit that this response is timely filed and fully response to the Office Action. By the above amendments, claims 1-3 and 7 have been canceled, claims 4-6 have been amended and new claims 8-10 have been added. Therefore, claims 4-6 and 8-10 remain pending and of which claims 4-6, 8 and 10 are independent. In light of the above amendments and detailed arguments to follow, reconsideration of the currently proposed rejection is respectfully requested.

Initially, the Applicants would like to thank the Examiner for the courtesies extended during the personal interview of January 14, 2004. Further, note is taken of the fact that Supplemental Amendment of December 1, 2003 (copy attached), containing new claim 7 (now canceled) and amendments to claims 1-3 (now canceled) has not been addressed by the Office Action of December 5, 2003, pursuant to 37 C.F.R. 1.111(a)(2). However, for purposes of this amendment, it is assumed the Supplemental Amendment has been entered into the application file.

With regard to the rejection of claims 1-6, under 35 U.S.C. § 103 (a), as being obvious in view of the combination of teachings of Toshihiko (JP '662) and Chace et al. ('825), this rejection is respectfully traversed.

The invention of claim 4 sets forth the following features:

...An outgas collection method comprising the steps of:
holding, within an exposure chamber under vacuum, a substrate on which surface a resist film is formed;
irradiating said resist film with an electron beam; and
collecting an outgas released from said resist film when irradiated with said electron beam to prevent the outgas from absorbing the energy of the electron beam (Emphasis Added)

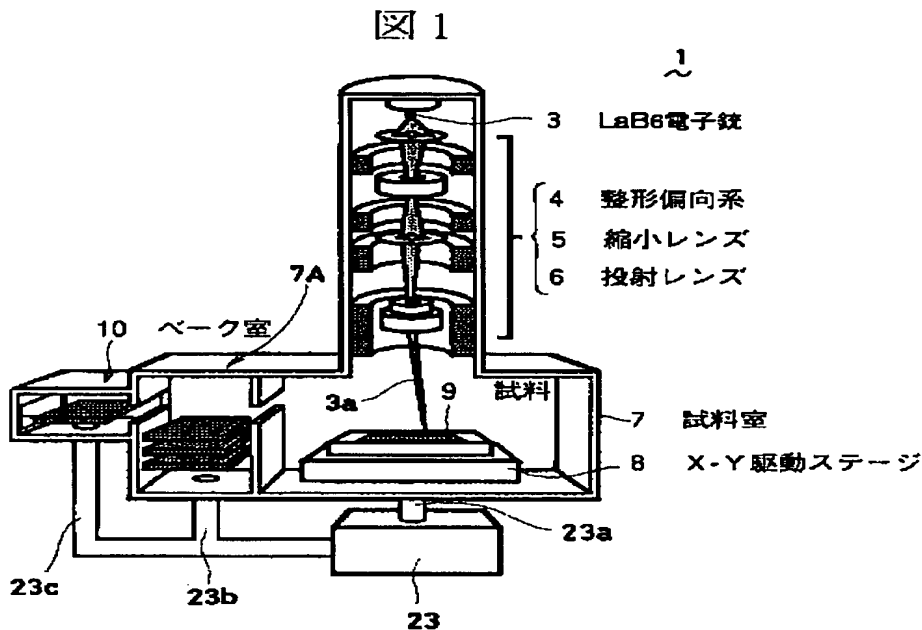
while new apparatus claim 8 recites the following:

8. (New) An electron beam exposure apparatus comprising:
a substrate holder provided within an exposure chamber under vacuum, and for holding a substrate on which surface a resist film is formed; and
electron beam irradiation means for irradiating said resist film with an electron beam,

wherein the exposure chamber is constructed such that an outgas, released from said resist film during irradiation with said electron beam, is collected in order to prevent the outgas from absorbing the energy of the electron beam.

However, a review of the teachings of both the Toshihiko and Chace et al. references reveals that the patentees do not teach each of the highlighted features above.

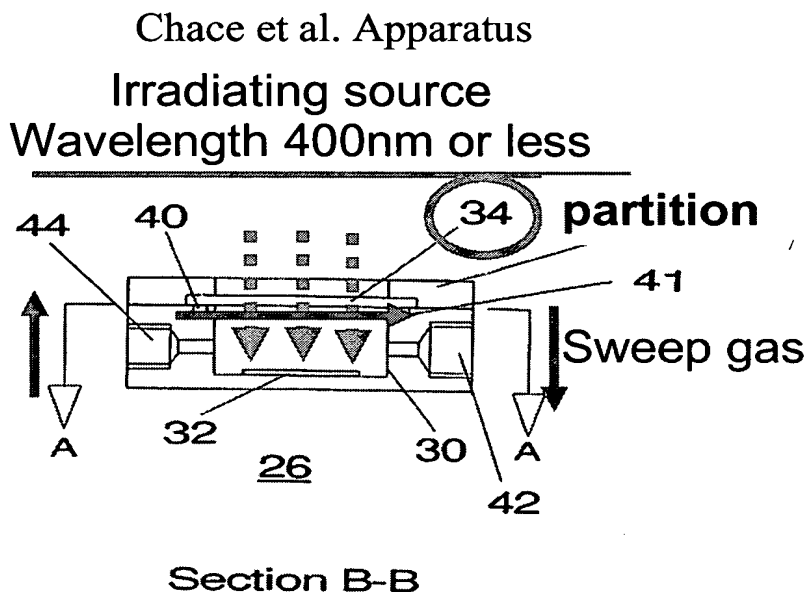
Specifically, Noguchi et al an apparatus and method of electron beam drawing on a photoresist exemplified by Figure 7:



As can be seen from Figure 7, the Toshihiko references performs the collection and analysis of the outgas after the baking performed in chamber 7A. Further, there is no discussion in Toshihiko of the suction means 23a withdrawing the outgas from the electron beam exposure or any appreciation of the need to remove the outgas to avoid the absorption of the energy of the electron beam.

The Chace et al. reference sets forth a process and apparatus for exposure which is illustrated by Figure 2B below. That is, the process and apparatus of Chace et al. utilizes a sweep gas in the irradiation chamber, into which the volatiles are taken up and delivered to the analyzer 20. In contrast, the method and apparatus of the invention the method of the invention occurs under vacuum, i.e., no sweep gas present, since Toshihiko desires to perform an analysis of the outgas from the baking

step, it is not suggested by Chace et al. (who teach a different exposure technique and the use of a sweep gas) modify Toshihiko to either move or add the analyzer to the evacuation chamber 7 and further would destroy the very invention of Toshihiko since movement of the collection and analyzer would not enable the analysis of the outgas from the baking; while, if added, the use of a sweep gas, which is necessary to take up the outgas, which would be detrimental to the electron beam exposure.



The differences between the combination of Toshihiko and Chace et al. and the instantly claimed invention is as follows:

1. Invention is different from Toshihiko regard to the point of the collection or analyzing, i.e. after baking. Toshihiko does not appreciate the irradiating step problem of electron beam exposure discussed by the Applicants.
2. Invention is different from Chace with regard to the irradiating source. The irradiating chamber of invention must have vacuum condition, because the electron beam is trapped (absorbed) by gas, the energy of irradiating reduced which results in the pattern being formed inadequately.
3. There is no motivation to combine the teachings of Toshihiko & Chace. Toshihiko is different from Chace with regard to the irradiation source, irradiation system, and the gas collecting step.


The differences are highlighted by the following table:

	Invention	Toshihiko	Chace
Collection & analyzing	At irradiating	After baking	During irradiating
Irradiating source	Electron Beam	EB drawing	Wavelength 400 nm or less

Therefore, since the Toshihiko & Chace do not teach or suggest the specifically claimed features of independent claims 4-6, 8 and 10, a *prima facie* case of obviousness has not been established. Consequently, the rejection of claims 1-6, under § 103(a), must now be withdrawn.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with Applicants' representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

This will acknowledge receipt of the following:

1. Transmittal Form
2. Supplemental Amendment

In re U.S. Patent Application of: Masyuki ENDO et al.
Serial No. 09/921,921
Filed: August 6, 2001

For: ELECTRON BEAM ALIGNER, OUTGASSING COLLECTION METHOD AND GAS ANALYSIS

Due Date: N/A
Docket No.: 740819-595

Date: December 1, 2003

PLEASE DATE STAMP AND RETURN

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/921,921	
	Filing Date	August 6, 2001	
	First Named Inventor	Masayuki ENDO et al.	
	Group Art Unit	2853	
	Examiner Name	Lam S. Nguyen	
Total Number of Pages in This Submission		Attorney Docket Number	740819-595

ENCLOSURES (check all that apply)		
<input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Supplemental Amendment <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request for 2 months. <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Declaration and Power of Attorney <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Application Data Sheet <input type="checkbox"/> Other Enclosure(s):
Remarks		<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees required or credit any overpayments to Deposit Account No. 19-2380 (740819-383) for the above identified docket number.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Thomas W. Cole, Reg. No. 28,290 Nixon Peabody LLP 409 9 th Street, N.W. Suite 900 Washington, D.C. 20004-2128
Signature	<i>Thomas W. Cole</i>
Date	December 1, 2003

CERTIFICATE OF MAILING	
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Docket No. 740819-595

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:)
Masayuki ENDO et al.) Examiner: Nguyen, Lam S.
Serial No.: 09/921,921) Group Art Unit: 2853
Filed: August 6, 2001) Confirmation No.: 8577
For: ELECTRON BEAM ALIGNER,)
OUTGASSING COLLECTION METHOD)
AND GAS ANALYSIS)

SUPPLEMENTAL AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to the Rule 116 Amendment filed September 11, 2003, please revise the claims as follows:

IN THE CLAIMS:

1. (Currently amended) An electron beam aligner comprising:

a substrate holder provided within an exposure chamber, [[and for holding]] which holds a substrate on which surface a resist film is formed; and

electron beam irradiation means for irradiating said resist film with an electron beam;
and

~~gas collection means provided on said exposure chamber by directly connecting thereto, and for collecting an outgassing released from said resist film when irradiated with said electron beam, wherein~~

said exposure chamber is arranged such that an outgas released from said resist film is trapped when irradiated with said electron beam.

2. (Original) The electron beam aligner of Claim 1, further comprising gas analysis means for analyzing a constituent of said outgassing collected by said gas collection means.

3. (Currently amended) An electron beam aligner comprising:

a substrate holder provided within an exposure chamber, [[and for holding]] which holds a substrate on which surface a resist film is formed;

electron beam irradiation means for irradiating said resist film with an electron beam;
and

~~gas analysis means provided on said exposure chamber by directly connecting thereto, and for analyzing a constituent of an outgassing released from said resist film when irradiated with said electron beam. wherein~~

said exposure chamber is arranged such that an outgas released from said resist film is analyzed when irradiated with said electron beam.

4. (Previously presented) An outgassing collection method comprising the steps of:
holding, within an exposure chamber, a substrate on which surface a resist film is formed;
irradiating said resist film with an electron beam; and
collecting an outgassing released from said resist film when irradiated with said electron beam.

5. (Previously presented) An outgassing analysis method comprising the steps of:
holding, within an exposure chamber, a substrate on which surface a resist film is formed;
irradiating said resist film with an electron beam;
collecting an outgassing released from said resist film when irradiated with said electron beam; and
analyzing a constituent of said collected outgassing.

6. (Previously presented) An outgassing analysis method comprising the steps of:
holding, within an exposure chamber, a substrate on which surface a resist film is formed;
irradiating said resist film with an electron beam; and
analyzing a constituent of an outgassing released from said resist film when irradiated with said electron beam.

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7. (New) An outgas collection method comprising the steps of:
holding, within an exposure chamber, a substrate on which surface a resist film is
formed;
irradiating said resist film with an electron beam; and
collecting an outgas released from said resist film by irradiating with said electron
beam.

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REMARKS

The purpose of this Amendment is to further clarify the claim language that distinguishes the invention from the prior art of record.

Respectfully submitted,



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